

CLAIMS

1. A process for the production of a monolithic article in which process an assembly of fibres of an polyolefin oriented polymer is subjected to a compaction stage wherein the assembly of fibres is maintained in intimate contact at an elevated temperature sufficient to melt a proportion of the polymer, and is compressed, characterised in that prior to the compaction stage the fibres have been subjected to a crosslinking process.
2. A process as claimed in Claim 1, wherein the compaction stage comprises two distinct steps, namely a step of maintaining the assembly of fibres in intimate contact at an elevated temperature sufficient to melt a proportion of the fibre at a first, contact, pressure, and a subsequent compression step wherein the assembly is subjected to a second, compaction, pressure, higher than the contact pressure.
3. A process as claimed in Claim 1, wherein the compaction stage comprises a single step of maintaining the assembly of fibres in intimate contact at a given pressure and at an elevated temperature sufficient to melt a proportion of the fibres.
4. A process as claimed in Claim 1, wherein the crosslinking process is an irradiation crosslinking process involving an ionising step which comprises irradiating the fibres with an ionising radiation,

and then an annealing step comprising annealing the irradiated polymer at an elevated temperature.

5 5. A process as claimed in Claim 4, wherein the irradiation step is carried out in an environment which is substantially free of oxygen gas and which comprises a monomeric compound selected from alkynes, and from alkenes having at least two double bonds.

10 6. A process as claimed in Claim 5, wherein said environment comprises acetylene.

15 7. A process as claimed in Claim 4, wherein the annealing step which follows irradiation is carried out in an environment which is substantially free of oxygen gas and which comprises a monomeric compound selected from alkynes, and from alkenes having at least two double bonds.

20 8. A process as claimed in Claim 7, wherein said environment comprises acetylene.

25 9. A process as claimed in Claim 1, wherein the fibres used in the process as formed from molten polymer.

10. A process as claimed in Claim 1, wherein the fibres have a weight average molecular weight in the range 10,000 to 400,000.

30 11. A process as claimed in Claim 10, wherein the fibres have a weight average molecular weight in the range 50,000 to 200,000.

35 12. A process as claimed in Claim 1, wherein the polyolefin polymer is selected from the group

comprising polypropylene homopolymer, a copolymer containing a major proportion of polypropylene, polyethylene homopolymer and a copolymer containing a major proportion of polyethylene.

- 5
13. A process as claimed in Claim 4, wherein the irradiation step is effected at a temperature not exceeding 100°C.
- 10 14. A process as claimed in Claim 13, wherein the irradiation step is effected at a temperature in the range 0-50°C.
- 15 15. A process as claimed in Claim 4, wherein the ionizing radiation is selected from electron beam, ultra-violet and γ -radiation.
- 20 16. A process as claimed in Claim 4, wherein the radiation dose is in the range 0.5 to 100 MRads.
- 25 17. A process as claimed in Claim 16, wherein the radiation dose is in the range 2 to 20 MRads.
- 30 18. A process as claimed in Claim 4, wherein the polyolefin polymer is annealed at a temperature of at least 60°C.
- 35 19. A process as claimed in Claim 4, wherein the polyolefin polymer after the irradiation and annealing steps has a gel fraction of at least 0.4
20. A process as claimed in Claim 19, wherein the polyolefin polymer after the irradiation and annealing steps has a gel fraction in the range 0.55 to 0.7.

21. A process as claimed in Claim 2; wherein the contact pressure is in the range 0.01 to 2 MPa, and the compaction pressure is in the range 0.1 to 50 MPa, but is higher than the contact pressure.
- 5
22. A process as claimed in Claim 21, wherein the contact pressure is in the range 0.3 to 0.7 MPa and the compaction pressure is in the range 0.6 to 7 MPa, but is at least double the contact pressure.
- 10
23. A process as claimed in Claim 3, wherein the single pressure applied is in the range 0.1 to 10 MPa.
- 15
24. A process as claimed in Claim 1, wherein the proportion of the polymer which melts during the compaction stage is 10 to 50% by weight.
- 20
25. A process as claimed in Claim 1, which process employs an inorganic filler material, such that the filler is present in the compacted monolithic article in an amount up to 60 vol% of the article.
- 25
26. A polyolefin polymer monolith prepared in accordance with the process of the invention, as claimed in Claim 1.